Sponsor Spotlight

Bergey Windpower

Distributed Wind 2025

Mike Bergey
President & CEO

BERGEY WINDPOWER

Student Projects – 1974-1977

University of Oklahoma

Bergey Windpower Co.

A World Leader in Small Wind

- 48th Year – 2nd oldest and most experienced manufacturer of small turbines in the world
- 1 – 15 kW for homes & farms
- Turbines have 2-3 moving parts
  - no scheduled maintenance
  - demonstrated 20+ years with 100% availability and zero O&M costs
- Over 10,000 installations, covering all 50 States and over 100 countries

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Bergey Turbines, 1980 - 2019

BWC 1000, 1980

BWC Excel, 1983

BWC 1500, 1990

BWC 850, 1994

BWC XL.1, 2000

BWC Excel 50, 2005

BWC Excel 6, 2012

Bergey Excel 15

Helical Anchors & Tilt-up 100’ SSL Tower – 2 Day Install

5 ½ “ Dia. x 8 ft. Helical Anchors

Tilt-up Tower on Helical Anchors

Skid-Steer with Helical Anchor Rig

R&D supported by US-DOE

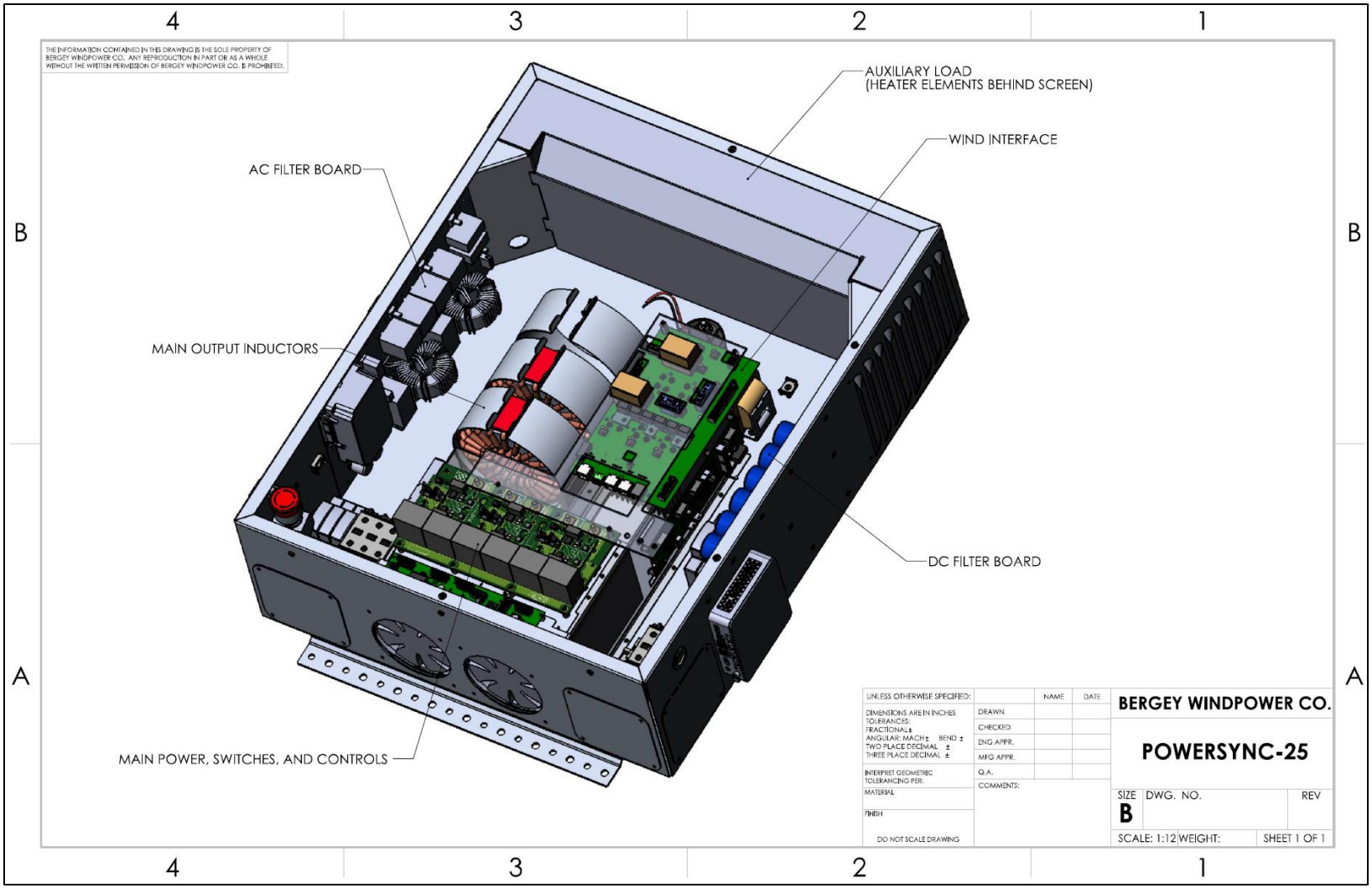
BWC builds the blades, alternators, nacelles, and electronics in-house

Excel 15

- USDA REAP grants are driving growth
- ~ 250 installed, ~ 80 on order
- Electronics constrained deliveries again in 2024
- Supply chain and materials cost issues are easing
- Gen-2 Powersync 25 inverter introduced in July
- Gen-2 PM alternator introduced in December
- Listing to UL 6142 expected in April

Advanced PS25 Inverter System

Developed with Intergrid (Temple, NH) under US-DOE R&D Funding



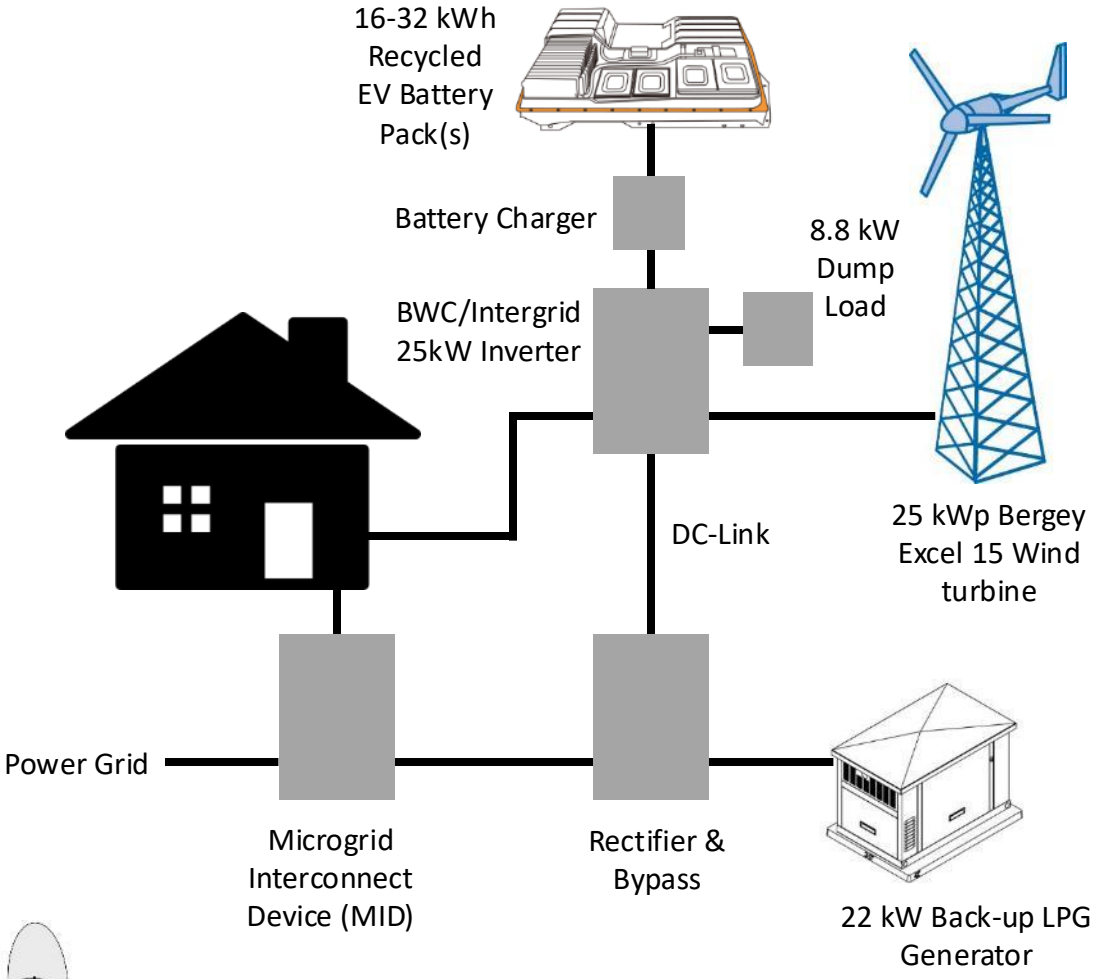
REAP-Fueled Agricultural Market

BWC 15 kW Retrofits

Replacing:

- Bergey 10 kW
- Jacobs 10, 17 & 20 kW
- Proven 15
- Gaia 11
- Endurance 60 kW
- Evoco/Osiris 10 kW
- ReDriven 10 & 20 kW
- Enertech 40 kW
- Numerous Chinese Models
- Xzeres 10 kW (special case – reduced rotor speed)

Excel 15 Home Microgrid System



Mode 1: Normal Operation

- Grid available
- MID connects to grid
- Generator off
- Inverter is grid-following
- Wind turbine reduces home's consumption of grid energy
- Excess energy maintains battery or exports to grid

Mode 2: Back-up (Grid Failure)

- MID isolates home
- Inverter switches to grid-forming
- Wind turbine & battery deliver power through inverter, with generator for back-up (providing extended-term power surety)

Mode 3: Peak Shaving/Voltage Support

- Utility dispatched (per EPA regulations)
- MID connects to grid
- Wind turbine & battery deliver constant power through inverter, with generator for back-up (providing firm dispatchability)

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“DER-Sales” Business Model for Rural Coop’s

- BWC has $1.15M US-DOE contract to evaluate – working with OEC coop in Norman
- REC sells and finances wind (or solar) 25 kW microgrid systems
- Customer gets tax credits, [depreciation] & savings, plus high capacity/long duration “whole house” resiliency
- REC gets peak-shaving, grid support and, perhaps, upgrade deferral
- Revenue positive for the REC

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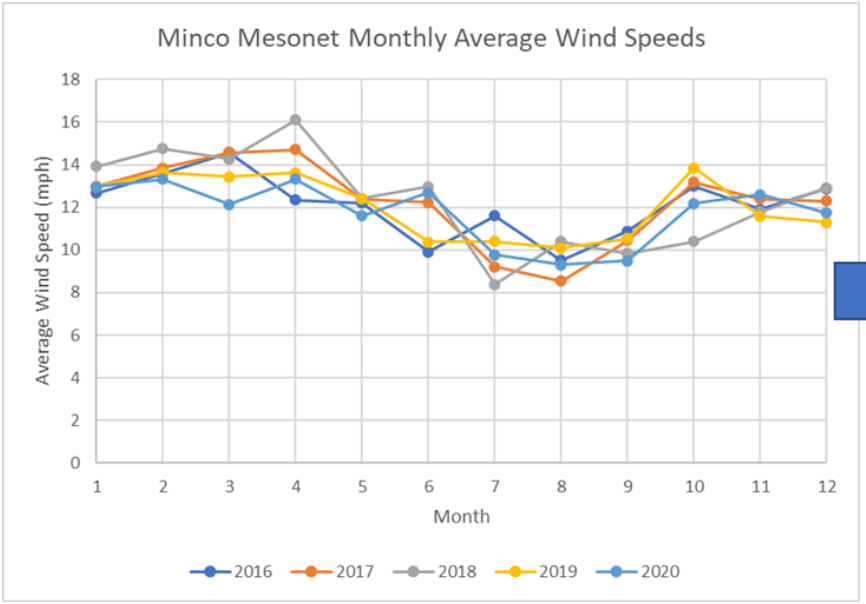
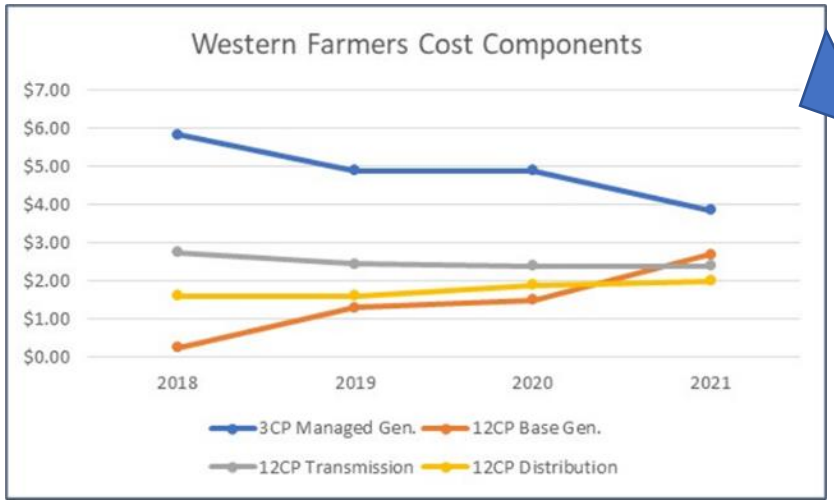
Determining Capacity Values (no storage)



3CP - 2019		Minco Mesonet Average WS (mph)	Minco Mesonet Average WS (m/s)	Assumed Wind Shear Exponent	Hub Height WS (m/s)	Excel 15 Power Output (kW)
Date	Time					
8/7/2019	17:00	22	9.84	0.2	12.25	15.3
8/10/2019	18:00	24	10.73	0.2	13.37	16.7
8/12/2019	18:00	13	5.81	0.2	7.24	6.1

3CP - 2020		Minco Mesonet Average WS (mph)	Minco Mesonet Average WS (m/s)	Assumed Wind Shear Exponent	Hub Height WS (m/s)	Excel 15 Power Output (kW)
Date	Time					
7/20/2018	18:00	15	6.71	0.2	8.35	8.2
7/19/2018	18:00	10	4.47	0.25	5.88	3.5
7/21/208	17:00	14	6.26	0.2	7.80	7.1

Ave. = 12.7 kW



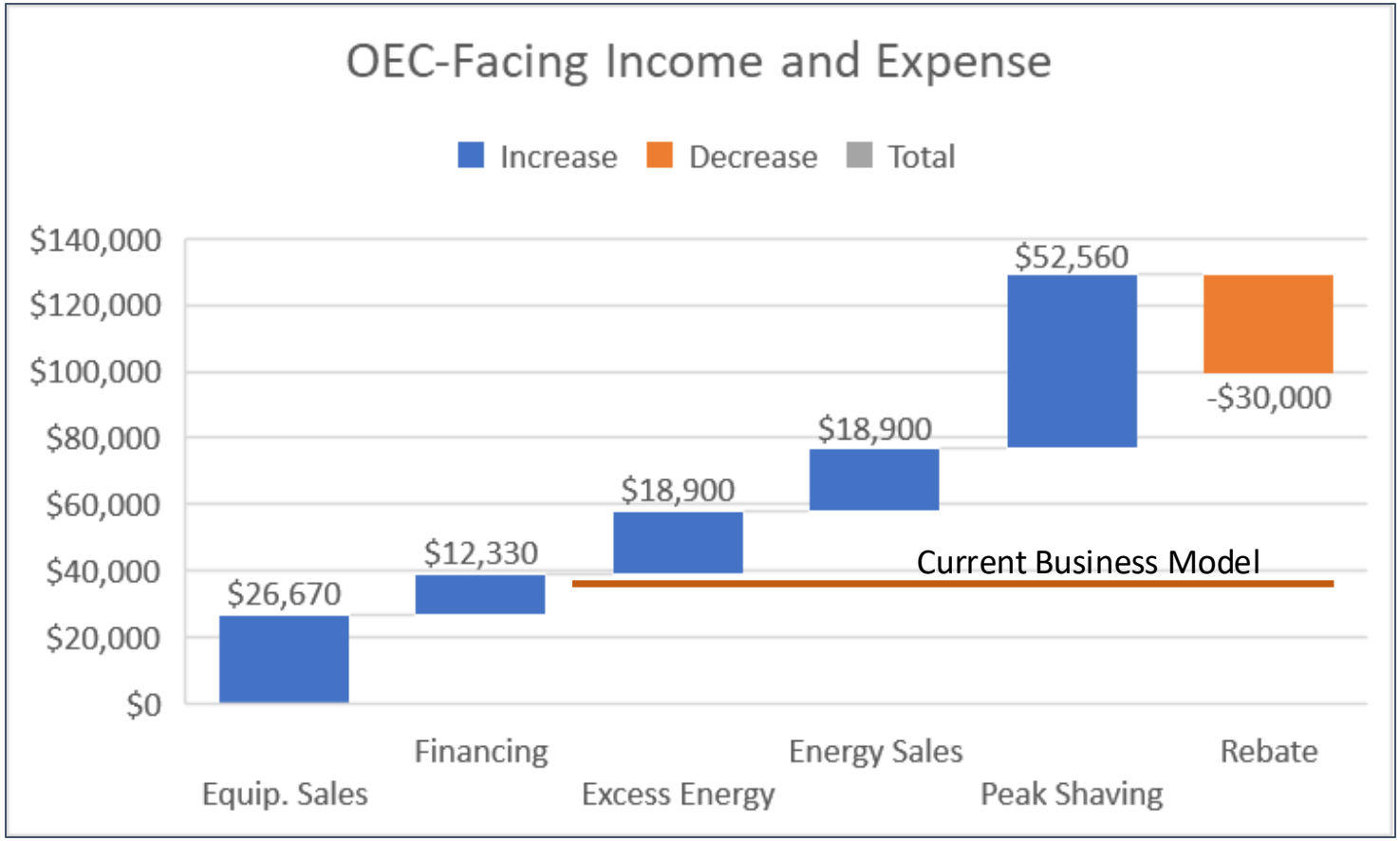
12CP - 2019		Minco Mesonet Average WS (mph)	Minco Mesonet Average WS (m/s)	Assumed Wind Shear Exponent	Hub Height WS (m/s)	Excel 15 Power Output (kW)
Date	Time					
1/29/2019	8:00	5	2.24	0.25	2.94	0.0
2/8/2019	8:00	17	7.60	0.2	9.47	10.8
3/4/2019	8:00	23	10.28	0.2	12.81	15.2
4/2/2019	8:00	9	4.02	0.25	5.30	2.6
5/23/2019	18:00	12	5.36	0.2	6.68	5.0
6/29/2019	18:00	8	3.58	0.25	4.71	1.8
7/16/2019	18:00	7	3.13	0.25	4.12	1.1
8/20/2019	18:00	10	4.47	0.25	5.88	3.5
9/7/2019	17:00	7	3.13	0.25	4.12	1.1
10/31/2019	8:00	18	8.05	0.2	10.02	10.9
11/12/2019	7:00	22	9.84	0.2	12.25	13.5
12/18/2019	8:00	8	3.58	0.25	4.71	1.8

Ave. = 5.6 kW

2019: $1,112

($2,693 w/storage)

20 Years DER-Sales OEC "Net Income"



DER-Sales Model Total Margin: $129,400
After Rebate: $99,400
Current Business Model: $37,800

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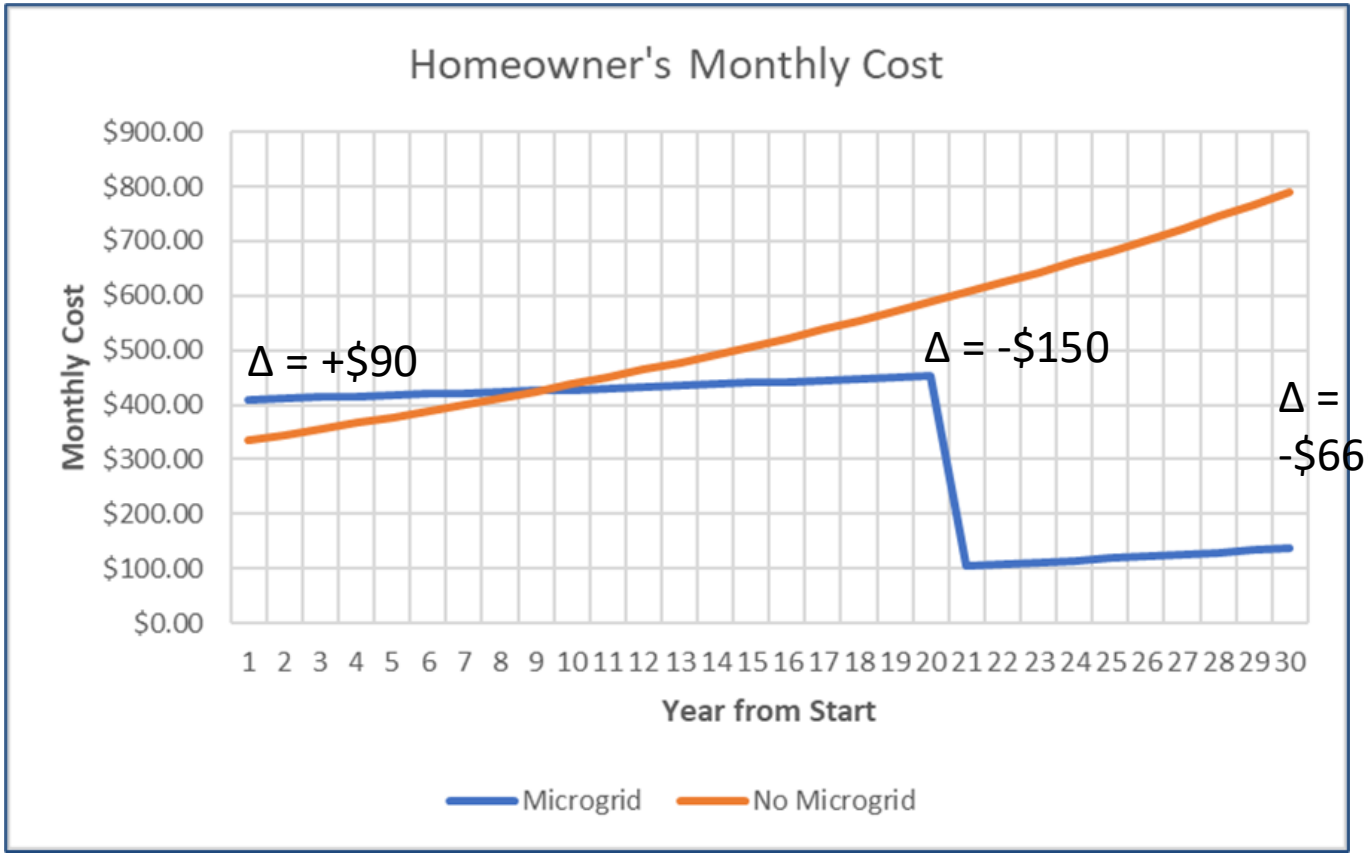
DER-Sales Homeowners Cash Flow



Monthly Cost Crossover in 9.5 Years

20 Year Loan and 30+ Year Operating Life

$50 - $80,000 Asset after 20 Years

Extended Period "Whole House" Back-up Power

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Deployable Advanced Renewable Power System (DARPS)

DARPS at Idaho National Lab

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BWC Management Team

From left:

- Tod Hanley – Chief Engineer
- Jason Young – GM & Accountant
- Hadi Ahari – Mgr., Electrical Dept.
- David Thomas – Shop Foreman
- Keith Marcom – Service Mgr.
- Mike Bergey – President & CEO
- Michael Soriano – Dir., Sales & Marketing

We Love What We Do